

# Design the Next Mars Scout Mission

A Candidate 2005 NASA Academy Group Project

## ACTIVITIES:

**Select the scientific problem to be studied** (E.g., search for hydrothermal venting; detecting trace bio-signature gases; find depth to deposits of buried ice; determine composition of layered terrains; monitor changes in humidity at the poles with season; high resolution mapping of crustal magnetic anomalies...)

**Consider the full range of individual or multiple platforms that could be used** (orbiters, landers, rovers, balloons, airplanes, penetrators, coring devices...and multi-stage combinations of these)

**Determine the study site and any special conditions required for observing, landing at or traversing the site**

**Determine the basic design of the spacecraft, platform and any additional deployable components** (including, if needed, the landing system, methods of locomotion, deployment of subsystems, if any, and the common requirements of power, communications...)

**Design the scientific package** (including individual instruments, their mass, volume, power, data rate and thermal requirements)

**Specify the basic surface operations to meet the scientific goals of the mission** (including options for flexibility where appropriate)

## DISCIPLINES INVOLVED:

Mars Geological and/or Atmospheric Science; Spacecraft and Subsystem Design (power, thermal systems, electronics, avionics); Structural, Mechanical and Electrical Engineering; Robotics; Trajectory Design and Navigation; Communications; Information Technology and Data Systems.

## Assume:

A new opportunity for a PI-class mission under the Mars Scout Program will be available for the 2011 or 2013 launch opportunity.

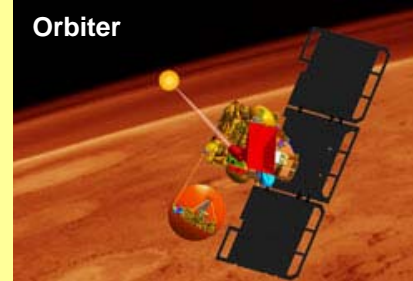
A variety of platforms are available (see figures)

Nuclear power is not available.

The cost cap for the mission is \$450M

## POSSIBLE MARS SCOUT PLATFORMS for 2011, 2013

Orbiter



Lander/Rover Base



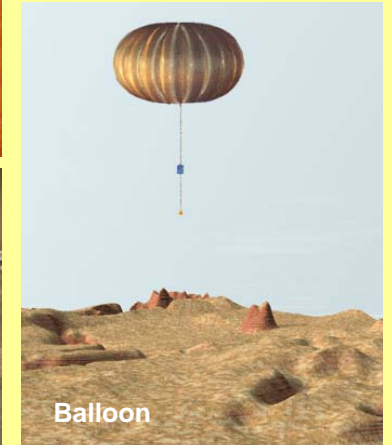
Cliff-Hanging Rover



Airplane



Balloon



Ice-Coring Lander

